



SBC86822 Series
Intel[®] Pentium[®] M All-In-One
Mini ITX CPU Board
With DualView Display and SATA
User's Manual

Disclaimers

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CAUTION

If you replace wrong batteries, it causes the danger of explosion. It is recommended by the manufacturer that you follow the manufacturer's instructions to only replace the same or equivalent type of battery, and dispose of used ones.

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ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

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MEMO

Chapter 1

Introduction



The **SBC86822**, a Mini ITX CPU board, supports Intel® Pentium® M/ Celeron® M processors with graphics, audio, and Gigabit Ethernet interfaces. It is practically finest embedded Pentium® M/ Celeron® M board in the market. It integrates LPC I/Os, UXGA, LCD, Ethernet and audio to make all in one single board. Additionally, it provides you with unique embedded features, such as 6 serial ports (RS-232) and Mini ITX form factor that applies an extensive array of PC peripherals. This industrial-grade board can achieve the best stability and reliability that makes your system perform the most endurable operation in any critical environments. The built-in Watchdog Timer has enhanced the system reliability that achieves a unique feature to distinguish itself from other boards.

Designed for the professional embedded developers, the Pentium® M/ Celeron® M embedded board **SBC86822 Series** is virtually ultimate one-step solution for embedded system applications.

1.1 Specifications

- **CPU**
 - Pentium® M/ Celeron® M processors
- **System Chipset**
 - Intel® 910GMLE & ICH6M
- **CPU Frequency**
 - 400 MHz FSB
- **BIOS**
 - Phoenix-Award BIOS, Y2K compliant
 - 4Mbit Flash, DMI, Plug and Play
 - SmartView for multiple LCD type selection, display mode option and application extension features
 - RPL/PXE Ethernet Boot ROM
 - “Load Optimized Default” to backup customized Setting in the BIOS flash chip to prevent from CMOS battery fail
- **System Memory**
 - Two x 240-pin DDR2 DIMM sockets
 - Maximum to 2 GB DDR2 memory
- **L2 Cache** -- Integrated in CPU
- **Onboard IDE**
 - One PATA-100 with 40-pin box-header
 - PATA-100 as PIO Mode 0-4, DMA Mode 0-2 and Ultra DMA/33/66/100
 - Two SATA-150 connectors
- **CompactFlash Socket**
 - One CompactFlash Type II Socket (optional)
- **Onboard Multi-I/O**
 - One 26-pin box-header for shared FDD/LPT
 - Six RS-232

- **USB Interface**
 - Eight USB ports with fuse protection and complies with USB Spec. Rev. 2.0
- **Watchdog Timer**
 - 1~255 seconds; up to 255 levels
- **Graphics**
 - Intel® 910GMLE GMCH Gen 3.5 integrated graphic engine
 - Signal/dual channel 18-bit LVDS LCD support
 - Maximum up to 224MB frame buffer sharing system memory
 - Maximum display resolution
 - ◆ CRT -- 2048 x1536
 - ◆ LVDS -- 1920 X1200 (18-bit single/dual channel LVDS interface)
 - LCD backlight control supported
- **Expansion Slot**
 - PCI slot for 2 Bus master 32-bit expansion
- **Ethernet**
 - Two RTL8111B Gigabit Ethernet
 - Wake On LAN (via ATX power supply)
 - Equipped with RJ-45 interface
- **Audio**
 - Realtek AC'97 codec audio
 - MIC-in, Line-out
- **Power Management**
 - ACPI (Advanced Configuration and Power Interface)
- **Form Factor**
 - **Mini ITX form factor**



NOTE All specifications and images are subject to change without notice.

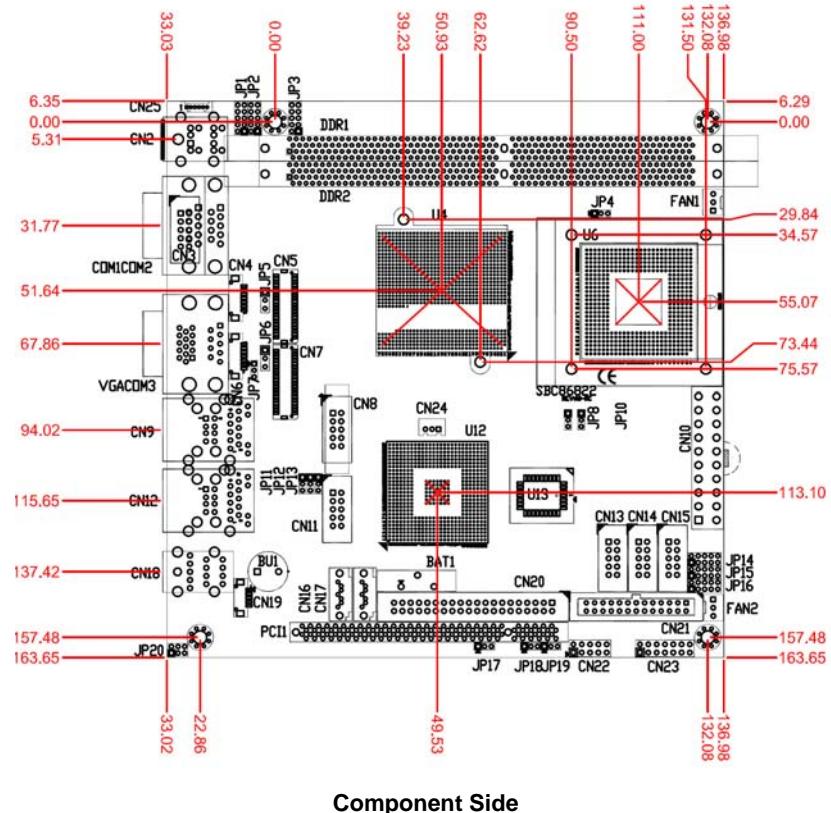
1.2 Utilities Supported

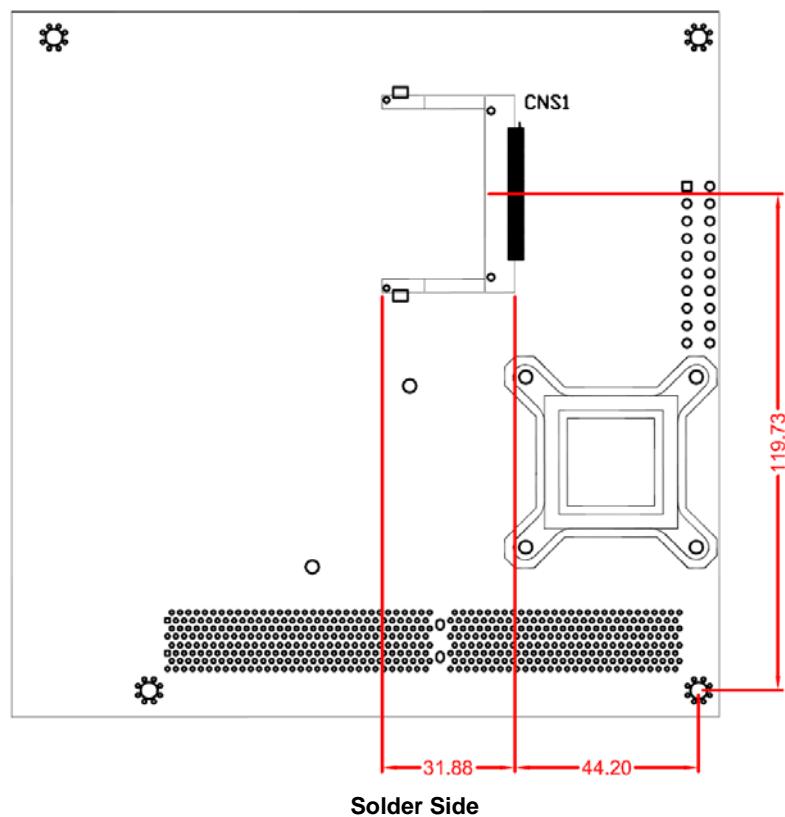
- Chipset Driver
- VGA Driver
- Ethernet Driver
- Audio Driver

Chapter 2

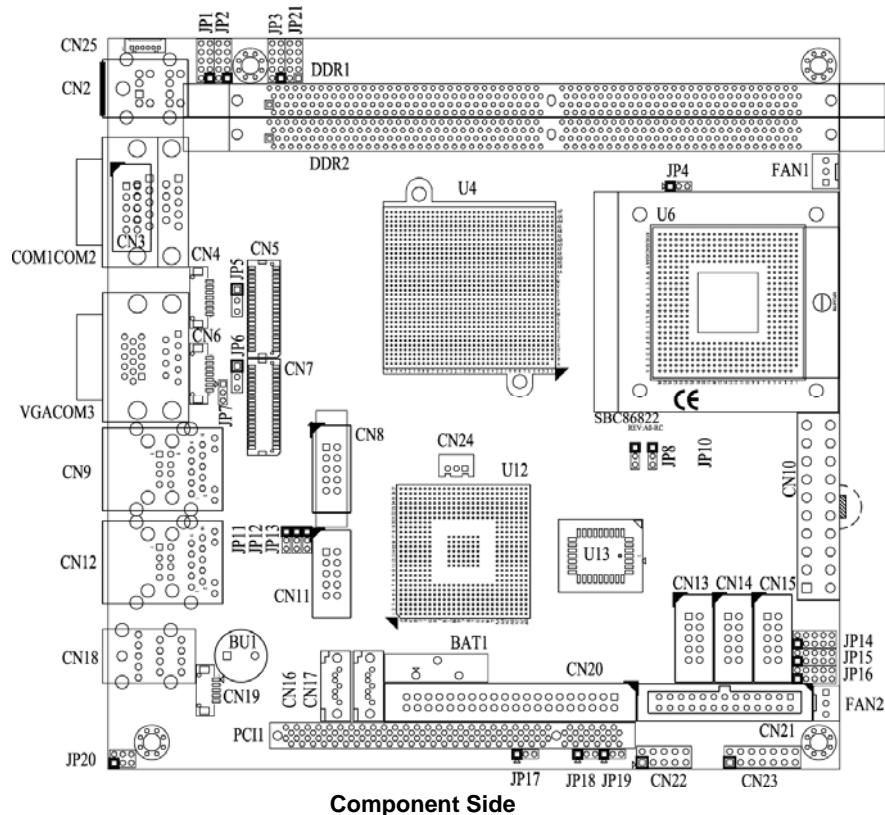
Jumpers and Connectors

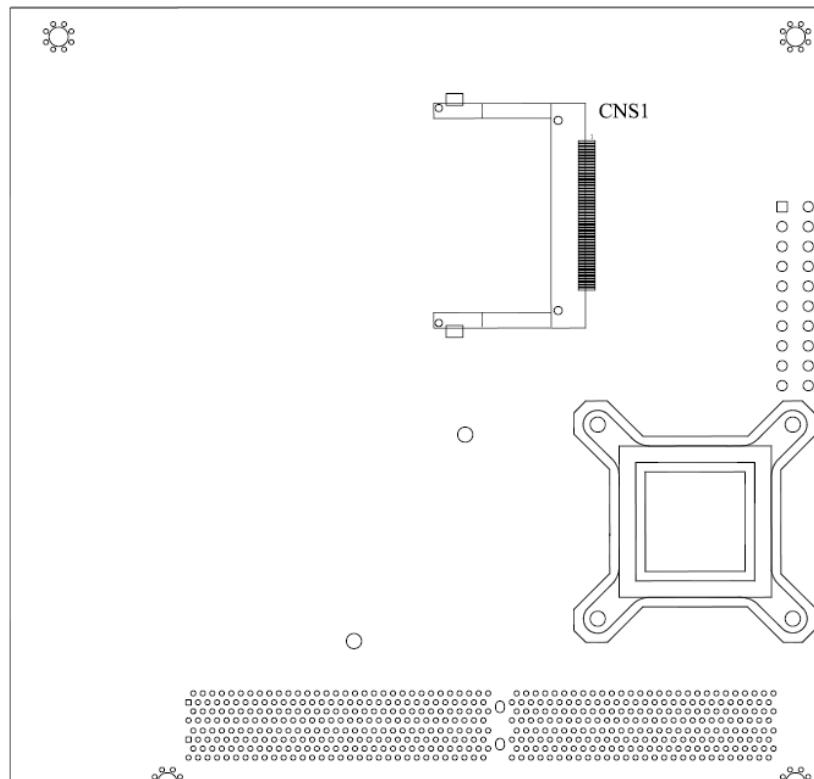
2.1 Board Dimensions and Fixing Holes





2.2 Board Layout





Solder Side

2.3 Jumper Settings

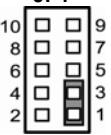
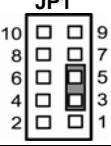
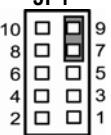
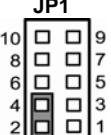
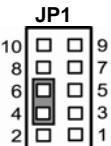
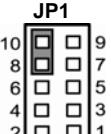
Proper jumper settings configure the **SBC86822** to meet your application purpose. We are herewith listing a summary table of all jumpers and default settings for onboard devices, respectively.

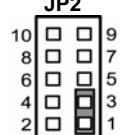
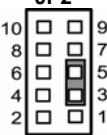
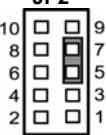
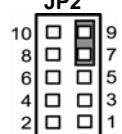
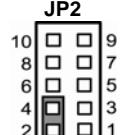
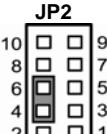
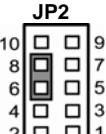
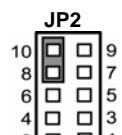
Jumper	Default Setting		Jumper Setting
JP1	COM1 Mode Select	COM1 Pin 1: DCD	Short 7-9
		COM1 Pin 9: RI	Short 8-10
JP2	COM2 Mode Select	COM2 Pin 1: DCD	Short 7-9
		COM2 Pin 9: RI	Short 8-10
JP3	COM3 Mode Select	COM3 Pin 1: DCD	Short 7-9
		COM3 Pin 9: RI	Short 8-10
JP4	CPU Voltage Select : Dothan (1.5V) <Only Socket Version>		Short 1-2
JP5	Flat Panel 2 Power Selection: Optional or Default : 3.3V		Short 1-2
JP6	Flat Panel 1 Power Selection: Default: 3.3V		Short 1-2
JP7	USB3(CN9) Voltage select : 5V_SBY		Short 1-2
JP8	CPU Clock Select : Auto <Only Socket Version>		Short 1-2
JP10	TPM Function (Optional)		Short 1-2
JP11	USB4(CN12) Voltage select : 5V_SBY		Short 1-2
JP12	USB1(CN8) Voltage select : 5V_SBY		Short 1-2
JP13	USB2(CN11) Voltage select : 5V_SBY		Short 1-2
JP14	COM6 Mode Select	CN15 Pin 1: DCD	Short 7-9
		CN15 Pin 8: RI	Short 8-10
JP15	COM5 Mode Select	CN14 Pin 1: DCD	Short 7-9
		CN14 Pin 8: RI	Short 8-10
JP16	COM4 Mode Select	CN13 Pin 1: DCD	Short 7-9
		CN13 Pin 8: RI	Short 8-10
JP17	Clear CMOS Setting: Normal		Short 1-2
JP18	CompactFlash Select Optional or Default : Slave		Short 1-2
JP19	CompactFlash Voltage Selection Optional or Default : 3.3V		Short 1-2
JP20	Audio Line Out/Speaker Out: Line Out		Short 1-3, 2-4
JP21	CN2, CN25 Keyboard/Mouse application Jumper		Short 1-3, 2-4, 7-9, 8-10

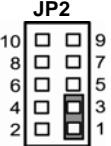
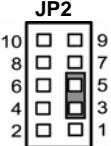
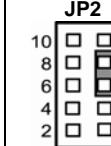
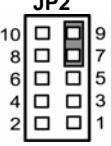
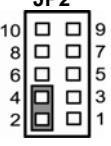
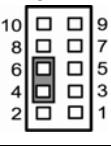
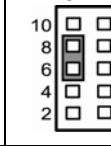
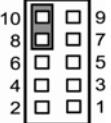
- ① **NOTICE 1** COM1COM2 is a built-in connector for COM1 and COM2 ports.
- ① **NOTICE 2** COM2 connectors are COLAY to and CN3 connectors.

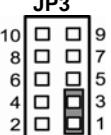
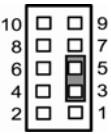
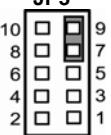
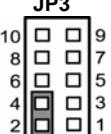
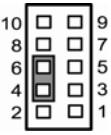
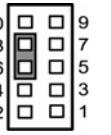
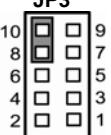
2.3.1 COM1~COM6 Mode Select for Type Jumpers (JP1, JP2, JP3, JP16, JP15, JP14)

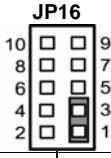
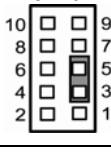
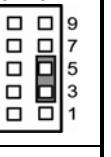
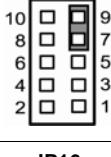
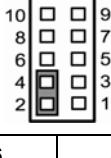
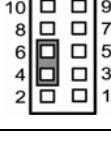
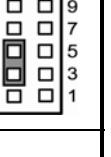
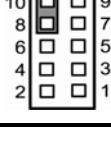
These jumpers select the COM1~COM6 ports' DCD and RI mode.

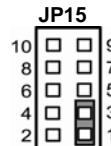
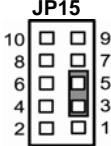
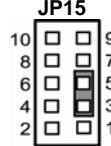
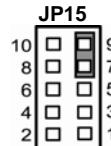
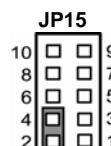
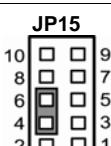
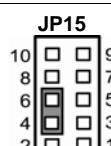
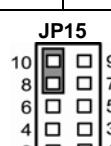
Description	Function	Jumper Setting
COM1	Pin 1=5V	
	Pin 1=12V	 
	*Pin 1=DCD	
	Pin 9=5V	
	Pin 9=12V	 
	*Pin 9=RI	

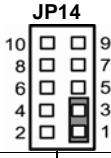
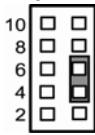
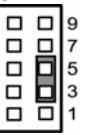
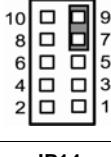
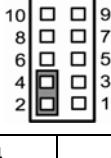
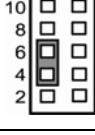
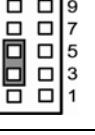
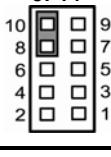
Description	Function	Jumper Setting																				
CN3(COM2)	Pin 1=5V	 <p>JP2</p> <table border="1"> <tr><td>10</td><td>9</td></tr> <tr><td>8</td><td>7</td></tr> <tr><td>6</td><td>5</td></tr> <tr><td>4</td><td>3</td></tr> <tr><td>2</td><td>1</td></tr> </table>	10	9	8	7	6	5	4	3	2	1										
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	Pin 9=5V	 <p>JP2</p> <table border="1"> <tr><td>10</td><td>□</td><td>□</td><td>9</td></tr> <tr><td>8</td><td>□</td><td>□</td><td>7</td></tr> <tr><td>6</td><td>□</td><td>□</td><td>5</td></tr> <tr><td>4</td><td>□</td><td>□</td><td>3</td></tr> <tr><td>2</td><td>□</td><td>□</td><td>1</td></tr> </table>	10	□	□	9	8	□	□	7	6	□	□	5	4	□	□	3	2	□	□	1																				
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	*Pin 9=R1	 <p>JP2</p> <table border="1"> <tr><td>10</td><td>□</td><td>□</td><td>9</td></tr> <tr><td>8</td><td>□</td><td>□</td><td>7</td></tr> <tr><td>6</td><td>□</td><td>□</td><td>5</td></tr> <tr><td>4</td><td>□</td><td>□</td><td>3</td></tr> <tr><td>2</td><td>□</td><td>□</td><td>1</td></tr> </table>	10	□	□	9	8	□	□	7	6	□	□	5	4	□	□	3	2	□	□	1																				
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Description	Function	Jumper Setting
COM3	Pin 1=5V	
	Pin 1=12V	 
*Pin 1=DCD		
Pin 9=5V		
Pin 9=12V		 
*Pin 9=RI		

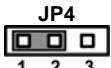
Description	Function	Jumper Setting	
COM4 (CN13)	Pin 1=5V		
	Pin 1=12V		
	*Pin 1=DCD		
	Pin 8=5V		
	Pin 8=12V		
	*Pin 8=RI		

Description	Function	Jumper Setting																			
COM5 (CN14)	Pin 1=5V	 <p>JP15</p> <table border="1"> <tr><td>10</td><td>9</td></tr> <tr><td>8</td><td>7</td></tr> <tr><td>6</td><td>5</td></tr> <tr><td>4</td><td>3</td></tr> <tr><td>2</td><td>1</td></tr> </table>	10	9	8	7	6	5	4	3	2	1									
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Pin 8=5V	 <p>JP15</p> <table border="1"> <tr><td>10</td><td>9</td></tr> <tr><td>8</td><td>7</td></tr> <tr><td>6</td><td>5</td></tr> <tr><td>4</td><td>3</td></tr> <tr><td>2</td><td>1</td></tr> </table>	10	9	8	7	6	5	4	3	2	1										
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Pin 8=12V	 <p>JP15</p> <table border="1"> <tr><td>10</td><td>9</td></tr> <tr><td>8</td><td>7</td></tr> <tr><td>6</td><td>5</td></tr> <tr><td>4</td><td>3</td></tr> <tr><td>2</td><td>1</td></tr> </table>  <p>JP15</p> <table border="1"> <tr><td>10</td><td>9</td></tr> <tr><td>8</td><td>7</td></tr> <tr><td>6</td><td>5</td></tr> <tr><td>4</td><td>3</td></tr> <tr><td>2</td><td>1</td></tr> </table>	10	9	8	7	6	5	4	3	2	1	10	9	8	7	6	5	4	3	2	1
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Description	Function	Jumper Setting	
COM6 (CN15)	Pin 1=5V		
	Pin 1=12V		
	*Pin 1=DCD		
	Pin 8=5V		
	Pin 8=12V		
	*Pin 8=RI		

2.3.2 CPU Analog Voltage Select Jumper (JP4)

Use this jumper to select the CPU analog voltage.

Description	Function	Jumper Setting
CPU Analog Voltage Select	Dothan 1.5V (Default)	 JP4 1 2 3
	Banias 1.8V	 JP4 1 2 3

2.3.3 Flat Panel Connector Voltage Selection Jumper (JP5, JP6)

The board supports +3.3V or +5V flat panel displays. Configure the jumper **JP6** to the appropriate voltage of the flat panel (LVDS1).

Description	Function	Jumper Setting
Flat Panel Connector (LVDS1) Voltage Selection	3.3V (Default)	 JP6 1 2 3
	5V	 JP6 1 2 3

The board supports +3.3V or +5V flat panel displays. Configure the jumper **JP5** to the appropriate voltage of the flat panel (LVDS2).

Description	Function	Jumper Setting
Flat Panel Connector (LVDS2) Voltage Selection	3.3V (Default)	JP5 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input type="checkbox"/>
	5V	JP5 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input type="checkbox"/>

2.3.4 USB Power Select Jumpers (JP7, JP11, JP12, JP13)

This jumper is to select the voltage for USB interface.

Description	Function	Jumper Setting
USB3 Connector (CN9) Voltage Selection	5V_SBY (Default)	JP7 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input type="checkbox"/>
	5V	JP7 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input type="checkbox"/>

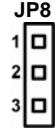
Description	Function	Jumper Setting
USB4 Connector (CN12) Voltage Selection	5V_SBY (Default)	JP11 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input type="checkbox"/>
	5V	JP11 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input type="checkbox"/>

Description	Function	Jumper Setting
USB1 Connector (CN8) Voltage Selection	5V_SBY (Default)	JP12 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input type="checkbox"/>
	5V	JP12 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input type="checkbox"/>

Description	Function	Jumper Setting
USB2 Connector (CN11) Voltage Selection	5V_SBY (Default)	JP13 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input type="checkbox"/>
	5V	JP13 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input type="checkbox"/>

2.3.5 CPU Clock Select Jumper (JP8)

Use this jumper to select the CPU clock.

Description	Function	Jumper Setting
CPU Clock Select	Auto (Default)	
	100 MHz	
	133 MHz	

2.3.6 TPM PP (Physical Presence) Select Jumper (JP10)

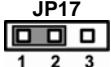
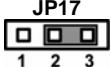
Description	Function	Jumper Setting
TPM PP (Physical Presence) Select	Accept both H/W & S/W signals. (Default)	
	Only Accept H/W signals.	



It is an optional jumper, not mounted as a default design.

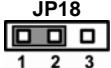
2.3.7 CMOS Clear Jumper (JP17)

You may need to use this jumper is to clear the CMOS memory if incorrect settings in the Setup Utility.

Description	Function	Jumper Setting
CMOS Clear	Normal (Default)	 JP17 1 2 3
	Clear CMOS	 JP17 1 2 3

2.3.8 CompactFlash Setting Jumper (JP18)(Optional)

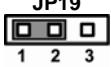
Use this jumper to set Master/Slave Compact Flash interface.

Description	Function	Jumper Setting
Compact Flash Master/Slave Selection	Master	 JP18 1 2 3
	Slave (Default)	 JP18 1 2 3

 It is an optional jumper, not mounted as a default design.

2.3.9 CompactFlash™ Power Selection Jumper (JP19)

This jumper is to select the voltage for CompactFlash™ interface.

Description	Function	Jumper Setting
CompactFlash™ Power Select	3.3V (Default)	JP19  1 2 3
	5V	JP19  1 2 3

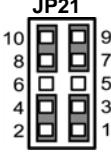
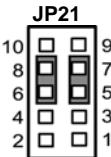
2.3.10 Audio Output Jumper (JP20)

This jumper makes the selection of Audio output.

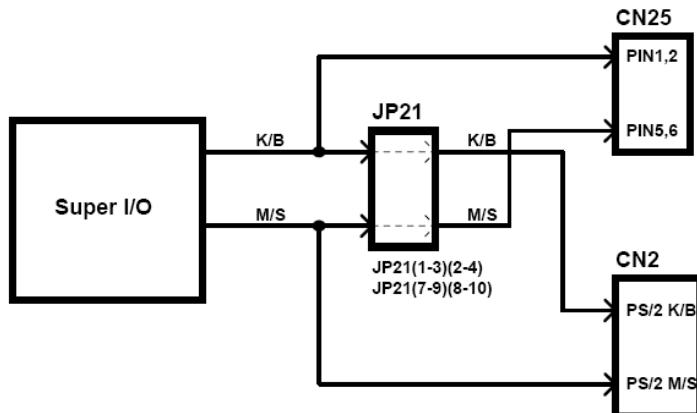
Description	Function	Jumper Setting
Audio Output	Line Out (Default)	JP20  2 4 6 1 3 5
	Speaker Out	JP20  2 4 6 1 3 5

2.3.11 CN2, CN25 Keyboard/Mouse application Jumper (JP21)

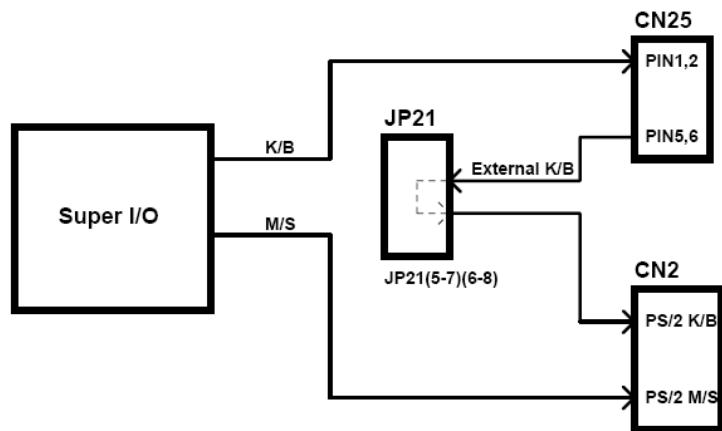
This jumper makes the selection of Keyboard/Mouse application.

Description	Function	Jumper Setting
Keyboard/Mouse Application Select	Application 1 (Default)	
	Application 2	

Application 1:



Application 2:



2.4 Connectors

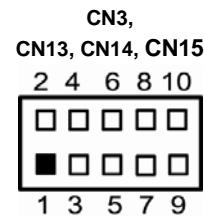
Connectors connect the CPU card with other parts of the system. Loose or improper connection might cause problems. Make sure all connectors are properly and firmly connected. Here is a summary table shows you all connectors on the **SBC86822 Series**.

Connectors	Label
Serial Port1 Connector	COM1
PS2 Keyboard/Mouse Connector	CN2
Serial Port2 Connector(COLAY to CN3)	COM2
Inverter Connector(LVDS2)(Optional)	CN4
LVDS2 Connector(Optional)	CN5
Inverter Connector(LVDS1)	CN6
LVDS1 Connector	CN7
Internal USB1 Connector	CN8
LAN1 & Dual USB3 Connector	CN9
ATX Power Connector	CN10
Internal USB2 Connector	CN11
LAN2 & Dual USB4 Connector	CN12
Internal Serial Port4 Connector	CN13
Internal Serial Port5 Connector	CN14
Internal Serial Port6 Connector	CN15
Serial ATA2 Connector	CN16
Serial ATA1 Connector	CN17
Audio Phone Jack Connector	CN18
Internal Audio Connector	CN19
Primary IDE Connector	CN20
Internal Printer Port Connector	CN21
DIO Port Connector	CN22
Flat Panel Bezel Connector	CN23
SMBUS Connector	CN24
Internal Keyboard/Mouse Connector	CN25
Compact Flash Connector(Optional)	CNS1
VGA & Serial Port3 Connector	VGACOM3
DDRII DIMM Connector	DDR1
DDRII DIMM Connector	DDR2
PCI Connector	PCI1
CPU FAN Connector	FAN1
SYSTEM FAN Connector	FAN2

2.4.1 Serial Port Interface Connectors (CN1, CN3, CN13, CN14, CN15)

CN3/CN13/CN14/CN15: COM2/COM4/COM5/COM6 Serial Port 10-pin (Box-header) Connector Pin Assignment list

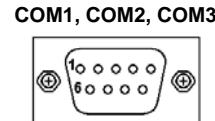
Pin	Description	Pin	Description
1	Data Carrier Detect (DCD)	2	Data Set Ready (DSR)
3	Receive Data (RXD)	4	Request to Send (RTS)
5	Transmit Data (TXD)	6	Clear to Send (CTS)
7	Data Terminal Ready (DTR)	8	Ring Indicator (RI)
9	Ground (GND)	10	No connector



NOTICE 1 COM2 for 10-pin box-header is optional.

COM1/COM2/COM3: COM1, COM2 and COM3 are DB-9 connectors is default. Here is the pin assignment list for your reference.

Pin	Description
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	GND, ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator



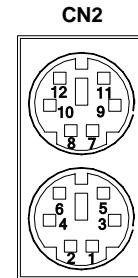
NOTICE 1 COM2 connectors are COLAY to CN3 connectors.
COM1/COM2 Default setting is DB-9 connector.

2.4.2 Keyboard and PS/2 Connector (CN2)

The **SBC86822** provides a keyboard and Mouse interface with a DIN connector. To install the PS/2 keyboard and mouse, plug the mouse to the upper port (green), and the keyboard to the lower port (purple).

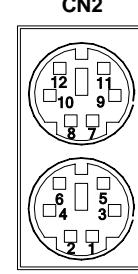
JP21 Application 1:

Pin	Signal	Pin	Signal
1	K/B Data	7	M/S Data
2	NC	8	NC
3	GND	9	GND
4	VCC	10	VCC
5	K/B CLK	11	M/S CLK
6	NC	12	NC



JP21 Application 2:

Pin	Signal	Pin	Signal
1	External K/B Data	7	M/S Data
2	NC	8	NC
3	GND	9	GND
4	VCC	10	VCC
5	External K/B CLK	11	M/S CLK
6	NC	12	NC

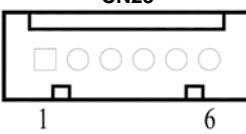


The 6-pin **CN25** connector is for PS/2 Mouse and PS/2 keyboard connection. The board supports a keyboard and Mouse interface.

JP21 Application 1:

Pin	Signal
1	K/B Data
2	K/B CLK
3	GND
4	+5V
5	M/S Data
6	M/S CLK

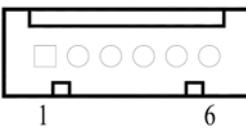
CN25



JP21 Application 2:

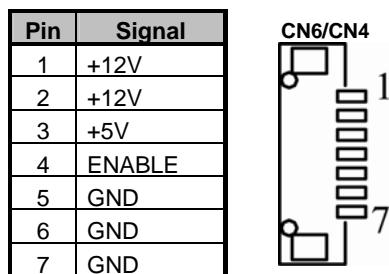
Pin	Signal
1	K/B Data
2	K/B CLK
3	GND
4	+5V
5	External K/B Data
6	External K/B CLK

CN25



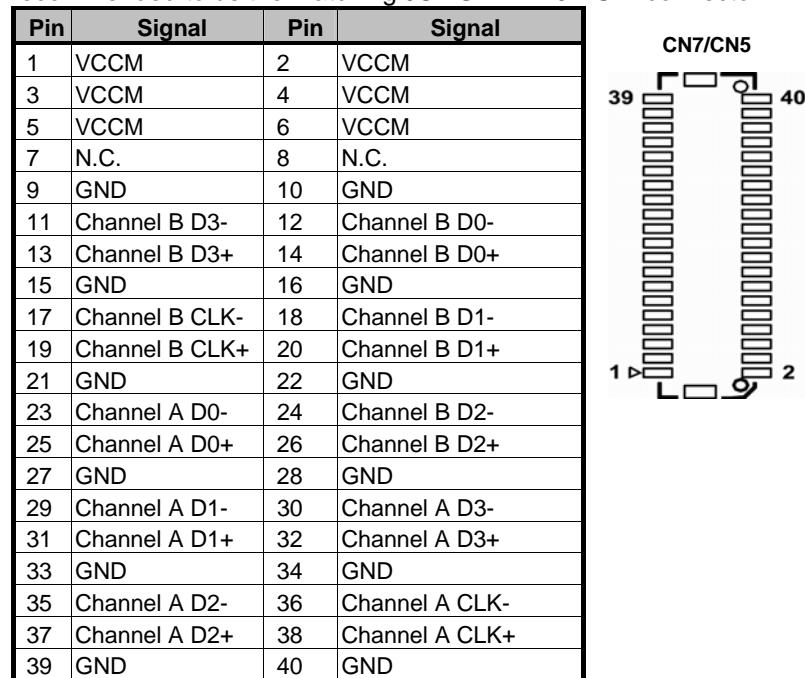
2.4.3 LVDS1/LVDS2 (Optional) Backlight Connectors (CN6, CN4)

The **CN6** and **CN4** are DF13-7S-1.25C 7-pin connectors for inverter that we strongly recommend you to use the matching DF13-7S-1.25C connector.



2.4.4 LVDS1/LVDS2 (Optional) Flat Panel Connectors (CN5, CN7)

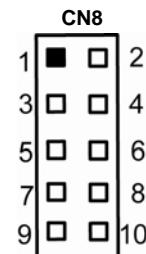
The LVDS connector on the SBC is a 40-pin connector. It is strongly recommended to us the matching JST SHDR-40V-S-B connector.



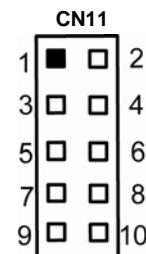
2.4.5 USB1/USB2 Connectors (CN8, CN11)

These Universal Serial Bus (USB) connectors on this board are for installing versatile USB interface peripherals. These are 10-pin standard USB connectors.

Pin	Signal	Pin	Signal
1	+5V	2	+5V
3	USB D0-	4	USB D1-
5	USB D0+	6	USB D1+
7	Ground (GND)	8	Ground (GND)
9	Ground (GND)	10	Ground (GND)



Pin	Signal	Pin	Signal
1	+5V	2	+5V
3	USB D2-	4	USB D3-
5	USB D2+	6	USB D3+
7	Ground (GND)	8	Ground (GND)
9	Ground (GND)	10	Ground (GND)



2.4.6 Ethernet with USB Connectors (LAN1, LAN2)

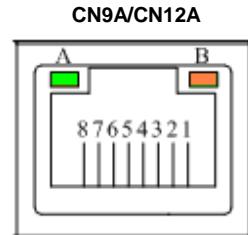
The **SBC86822 Series** has three layers of GIGA Ethernet & USB Connectors (**CN9, CN12**).

The RJ-45 connector is for Ethernet. To connect the board to a 100/10 Base-T hub, just plug one end of the cable into **CN9A** and **CN12A**, and connect the other end (phone jack) to a 1000/100/10-Base-T hub.

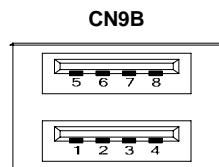
The lower double-deck USB Connector (**CN9B, CN12B**) supports USB 2.0 compliant (480Mbps) that can be connected to any USB peripherals, such as keyboard, mouse, scanner.

Please refer to the pin assignment list next page.

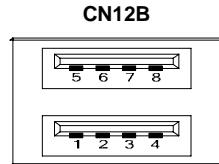
Pin	Signal
1	MDI0+
2	MDI0-
3	MDI1+
4	MDI1-
5	MDI2+
6	MDI2-
7	MDI3+
8	MDI3-
A	100 LAN LED (Green)/ 1000 LAN LED (Orange)
B	Active LED (Orange)



Pin	Signal
1	+5V
2	USB D4-
3	USB D4+
4	GND
5	+5V
6	USB D5-
7	USB D5+
8	GND



Pin	Signal
1	+5V
2	USB D6-
3	USB D6+
4	GND
5	+5V
6	USB D7-
7	USB D7+
8	GND



2.4.7 ATX Power Connector (CN10)

Steady and sufficient power can be supplied to all components on the board by connecting the power connector. Please make sure all components and devices are properly installed before connecting the power connector. Align the power connector with its proper location on the board, and connect it tightly.

If you use a 20-pin ATX power supply, please remove the small cover from the power connector before plugging in the power cord; otherwise, please do not remove it.

Pin	Signal	Pin	Signal
1	3.3V	11	3.3V
2	3.3V	12	-12V
3	GND	13	GND
4	5V	14	PS_ON
5	GND	15	GND
6	5V	16	GND
7	GND	17	GND
8	PW_OK	18	-5V
9	5V_SB	19	5V
10	12V	20	5V

CN10

2.4.8 SATA Connectors (CN16, CN17)

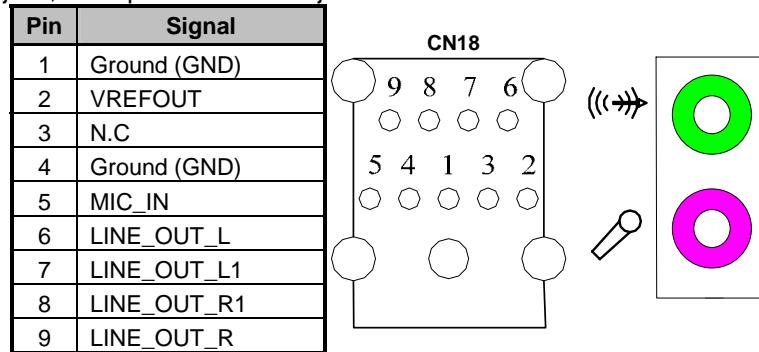
These SATA connectors are for high-speed SATA interface ports and they can be connected to hard disk devices.

Pin	Signal
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+

CN16/CN17

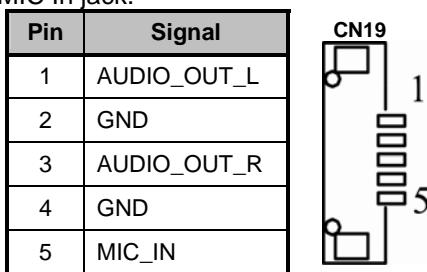
2.4.9 Audio Phone Jack Connector (CN18)

After install onboard audio driver, you may connect speaker to Line Out jack, microphone to MIC in jack.



2.4.10 Internal Audio Connector (CN19)

The **SBC86822** supports internal audio interface. **CN19** is a 5pin-header connector commonly used for the audio. After installing onboard audio driver, you may connect speaker to Line Out jack, and microphone to MIC In jack.

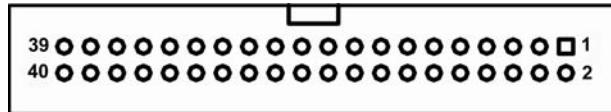


2.4.11 Enhanced IDE Interface Connector (CN20)

There are three built-in IDE channels, one parallel ATA-100 and two serial ATA-150, which support up to four IDE devices. **CN20** is a 40-pin IDE interface connector for standard 3.5" IDE device.

Pin	Signal	Pin	Signal	Pin	Signal
1	Reset #	2	GND	3	Data 7
4	Data 8	5	Data 6	6	Data 9
7	Data 5	8	Data 10	9	Data 4
10	Data 11	11	Data 3	12	Data 12
13	Data 2	14	Data 13	15	Data 1
16	Data 14	17	Data 0	18	Data 15
19	GND	20	No connector	21	No connector
22	GND	23	IOW #	24	GND
25	IOR #	26	GND	27	IOCHRDY
28	No connector	29	No connector	30	GND-Default
31	Interrupt	32	No connector	33	SA1
34	No connector	35	SA0	36	SA2
37	HDC CS0 #	38	HDC CSI #	39	HDD Active #
40	GND				

CN20



2.4.12 Parallel Port Interface Connector (CN21)

The board has one one 26-pin header connector **CN21** for onboard parallel port. The onboard PRN is a multi-mode parallel port that supports:

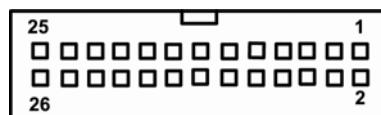
1. **Standard mode:**
IBM PC/XT, PC/AT and PS/2™ compatible with bi-directional parallel port
2. **Enhanced mode:**
Enhance parallel port (EPP) compatible with EPP 1.7 and EPP 1.9 (IEEE 1284 compliant)
3. **High speed mode:**
Microsoft and Hewlett Packard extended capabilities port (ECP)
IEEE 1284 compliant

You can enter the BIOS CMOS Setup Utility to configure the address selection of onboard parallel port, CN21 (378H) or Disabled.

CN21: Parallel Port (Box Header) Connector Pin Assignment

Pin	Signal	Pin	Signal
1	Strobe#	2	Auto Form Feed#
3	Data 0	4	Error#
5	Data 1	6	Initialize#
7	Data 2	8	Printer Select In#
9	Data 3	10	GND
11	Data 4	12	GND
13	Data 5	14	GND
15	Data 6	16	GND
17	Data 7	18	GND
19	Acknowledge#	20	GND
21	Busy	22	GND
23	Paper Empty#	24	GND
25	Printer Select	26	NC

CN21



2.4.13 Digital I/O Port (DIO) Connector (CN22)

The board is equipped an 8-channel digital I/O connector **CN22** that meets requirements for a system customary automation control. The digital I/O can be configured to control cash drawers and sense warning signals from an Uninterrupted Power System (UPS), or perform store security control. The digital I/O is controlled via software programming.

Please refer to next page for the detailed pin assignment list.

Pin	Signal	Pin	Signal
1	Digital Input 0	2	Digital Output 0
3	Digital Input 1	4	Digital Output 1
5	Digital Input 2	6	Digital Output 2
7	Digital Input 3	8	Digital Output 3
9	Ground (GND)	10	Ground (GND)

CN22

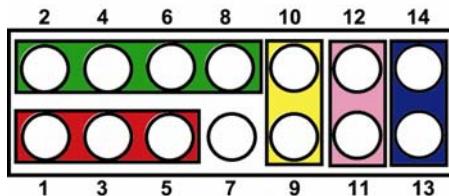
Digital Input Address : 402A

Digital Output				Digital Input			
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
X	X	DI3	DI2	DI1	DI0	X	X

Digital Output :

Digital Output				Digital Input			
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
X	X	X	X	DO3	DO2	DO1	DO0

2.4.14 Flat Panel Bezel Connector (CN23)



■ Power LED

This 3-pin connector denoted as Pin 1 and Pin 5 connects the system power LED indicator to such a switch on the case. Pin 1 is assigned as +, and Pin 5 as -. The Power LED lights up when the system is powered ON.

■ **External Speaker and Internal Buzzer Connector**

Pin 2, 4, 6 and 8 can be connected to the case-mounted speaker unit or internal buzzer. While connecting the CPU card to an internal buzzer, please short pins 2-4; while connecting to an external speaker, you need to set pins 2-4 to Open and connect the speaker cable to pin 8 (+) and pin 2 (-).

■ **ATX Power On/Off Button**

This 2-pin connector denoted as Pin 9 and 10 connects the front panel's ATX power button to the CPU card, which allows users to control ATX power supply to be power on/off.

■ **System Reset Switch**

Pin 11 and 12 can be connected to the case-mounted reset switch that reboots your computer instead of turning OFF the power switch. It is a better way to reboot your system for a longer life of the system's power supply.

■ **HDD Activity LED**

This connection is linked to hard drive activity LED on the control panel. LED flashes when HDD is being accessed. Pin 13 and 14 connect the hard disk drive to the front panel HDD LED, Pin 13 assigned as -, and Pin 14 as +.

2.4. 15 CompactFlash™ Socket (CNS1)

The board is equipped with a CompactFlash™ disk type-II socket on the solder side that supports the IDE interface CompactFlash™ disk card with DMA mode supported. The socket is especially designed to avoid any incorrect installation of the CompactFlash™ disk card.

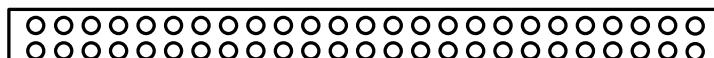
When installing or removing the CompactFlash™ disk card, please make sure that the system power is off. The CompactFlash™ disk card is defaulted as the C: or D: disk drive in your PC system.

Pin	Signal	Pin	Signal
1	GND	26	CD1-
2	Data 3	27	Data 11
3	Data 4	28	Data 12

Pin	Signal	Pin	Signal
4	Data 5	29	Data 13
5	Data 6	30	Data 14
6	Data 7	31	Data 15
7	CS0#	32	CS1#
8	Address 10	33	VS1#
9	ATASEL	34	IORD#
10	Address 9	35	IOWR#
11	Address 8	36	WE#
12	Address 7	37	INTR
13	VCC	38	VCC
14	Address 6	39	CSEL#
15	Address 5	40	VS2#
16	Address 4	41	RESET#
17	Address 3	42	IORDY#
18	Address 2	43	DMAREQ
19	Address 1	44	DMAACK-
20	Address 0	45	DASP#
21	Data 0	46	PDIAG#
22	Data 1	47	Data 8
23	Data 2	48	Data 9
24	IOCS16#	49	Data 10
25	CD2#	50	GND

CNS1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25



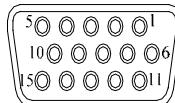
26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

2.4.16 VGA Connector (VCOM3B)

VCOM3B is a standard 15-pin DB15 connector commonly for the CRT VGA display.

Pin	Signal
1	Red
2	Green
3	Blue
4	N.C
5	Ground (GND)
6	AnalogGround (AGND)
7	AnalogGround (AGND)
8	AnalogGround (AGND)
9	N.C
10	Ground (GND)
11	N.C
12	DDC DATA
13	Horizontal Sync
14	Vertical Sync
15	DDC CLK

VCOM3B

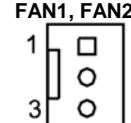


2.4.17 CPU and System Fan Connectors (FAN1, FAN2)

FAN1 and **FAN2** are CPU and System FAN Connectors. Pentium microprocessors require a fan for heat dispensing. The fan connector is to supply fan power.

FAN1/FAN2: 3PIN FAN Connector

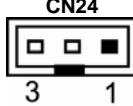
Pin	Signal
1	Ground
2	+12V
3	Rotation Detection



2.4.18 SMBUS Connectors (CN24)

Connector CN24 is for SMBUS interface support.

Pin	Signal
1	CLOCK
2	DATA
3	GND



The diagram shows a rectangular connector labeled 'CN24' at the top. Below the label, there are two small square pads. The left pad is labeled '3' and the right pad is labeled '1', indicating the pin-out for the SMBUS interface.

Chapter 3

Hardware Description

3.1 Microprocessors

The **SBC86822 Series** supports Intel® Pentium® M/Celeron® M processors, which make your system operated under Windows 2000/XP and Linux environments. The system performance depends on the microprocessor. Make sure your installed microprocessor with all correct settings that prevents the CPU from damages.

3.2 BIOS

The **SBC86822 Series** uses Award Plug and Play BIOS with a single 4Mbit Flash EPROM.

3.3 System Memory

The **SBC86822 Series** industrial CPU card supports two 240-pin DDR2 DIMM sockets for a maximum memory of 2 GB DDR2 SDRAMs. The memory module can come in sizes of 64MB, 128MB, 256MB, 512MB, 1GB and 2GB.

3.4 I/O Port Address Map

The Intel® Pentium® M/Celeron® M CPUs can communicate via I/O ports. There are total 1KB port addresses available for assignment to other devices via I/O expansion cards.

Address	Devices
000-01F	DMA controller #1
020-03F	Interrupt controller #1
040-05F	Timer
060-06F	Keyboard controller
070-07F	Real time clock, NMI
080-09F	DMA page register
0A0-0BF	Interrupt controller #2
0C0-0DF	DMA controller #2
0F0	Clear math coprocessor busy signal
0F1	Reset math coprocessor
0F8-0FF	Math processor
1F0-1F8	Fixed disk controller
250-25F	HR I/O
300-31F	Prototype card
380-38F	SDLC #2
3A0-3AF	SDLC #1
3B0-3BF	MDA video card (including LPT1)
3C0-3CF	EGA card
3D0-3DF	CGA card
3F8-3FF	Serial port #1 (COM1)
3E8-3EF	Serial port #3 (COM3)
2F8-2FF	Serial port #2 (COM2)
2E8-2EF	Serial port #4 (COM4)
2E0-2E7	Serial port #5 (COM5)
2F0-2F7	Serial port #6 (COM6)
3F0-3FF	Super I/O

3.5 Interrupt Controller

The **SBC86822 Series** is a 100% PC compatible control board. It consists of 16 interrupt request lines, and four out of them can be programmable. The mapping list of the 16 interrupt request lines is shown as the following table.

IRQ	Parity check error
IRQ0	System timer output
IRQ1	Keyboard
IRQ2	Interrupt rerouting from IRQ8 through IRQ15
IRQ3	Serial port #2, #4, #5
IRQ4	Serial port #1, #3, #6
IRQ5	PCI Device Share
IRQ7	Parallel port #1
IRQ8	Real time clock
IRQ9	ACPI Controller
IRQ10	PCI Device Share
IRQ11	PCI Device Share
IRQ12	PS/2 Mouse
IRQ13	Math coprocessor
IRQ14	Primary IDE channel
IRQ15	Second IDE channel

MEMO

Chapter 4

Award BIOS Utility

The Phoenix-Award BIOS provides users with a built-in Setup program to modify basic system configuration. All configured parameters are stored in a battery-backed-up RAM (CMOS RAM) to save the Setup information whenever the power is turned off.

4.1 Entering Setup

There are two ways to enter the Setup program. You may either turn ON the computer and press **** immediately, or press the **** and/or **<Ctrl>**, **<Alt>**, and **<Esc>** keys simultaneously when the following message appears at the bottom of the screen during POST (Power on Self Test).

TO ENTER SETUP PRESS DEL KEY

If the message disappears before you respond and you still want to enter Setup, please restart the system to try it again. Turning the system power OFF and ON, pressing the “RESET” button on the system case or simultaneously pressing **<Ctrl>**, **<Alt>**, and **** keys can restart the system. If you do not press keys at the right time and the system doesn't boot, an error message will pop out to prompt you the following information:

PRESS **<F1>** TO CONTINUE, **<CTRL-ALT-ESC>** OR **** TO ENTER SETUP

4.2 Control Keys

Up arrow	Move cursor to the previous item
Down arrow	Move cursor to the next item
Left arrow	Move cursor to the item on the left hand
Right arrow	Move to the item in the right hand
Esc key	Main Menu -- Quit and delete changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
PgUp/“+” key	Increase the numeric value or make changes
PgDn/“-” key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key	Reserved
F3 key	Reserved
F4 key	Reserved
F5 key	Restore the previous CMOS value from CMOS, only for Option Page Setup Menu
F6 key	Reserved
F7 key	Load the Setup default, only for Option Page Setup Menu
F8 key	Reserved
F9 key	Reserved
F10 key	Save all the CMOS changes, only for Main Menu

4.3 Getting Help

- **Main Menu**

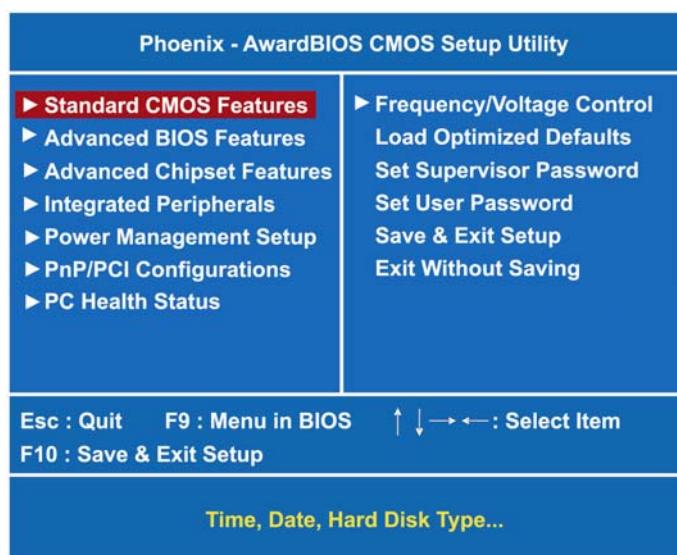
The online description of the highlighted setup function is displayed at the bottom of the screen.

- **Status Page Setup Menu/Option Page Setup Menu**

Press <F1> to pop out a small Help window that provides the description of using appropriate keys and possible selections for highlighted items. Press <F1> or <Esc> to exit the Help Window.

4.4 The Main Menu

Once you enter the Award BIOS CMOS Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from ten setup functions and two exit choices. Use the arrow keys to select the setup function you intend to configure then press <Enter> to accept or enter its sub-menu.

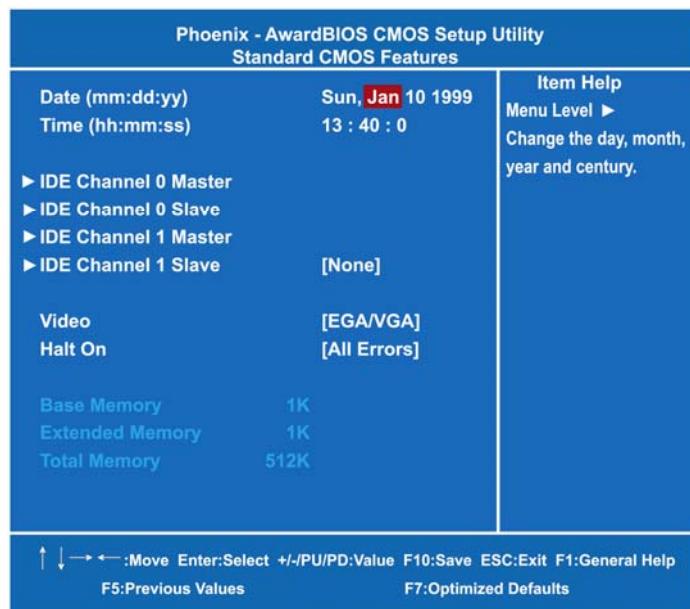


NOTE *If you find that your computer cannot boot after making and saving system changes with Setup, the Award BIOS, via its built-in override feature, resets your system to the CMOS default settings.*

We strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both Award and your system manufacturer to provide the absolute maximum performance and reliability.

4.5 Standard CMOS Setup Menu

The items in Standard CMOS Setup Menu are divided into 10 categories. Each category includes no, one or more than one setup items. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.



- **Date**

The date format is <day>, <date> <month> <year>. Press <F3> to show the calendar.

day	The day of week, from Sun to Sat, determined by the BIOS, is read only
date	The date, from 1 to 31 (or the maximum allowed in the month), can key in the numerical / function key
month	The month, Jan through Dec.
year	The year, depends on the year of BIOS

- **Time**

The time format is <hour> <minute> <second> accepting either functions key or numerical key. The time is calculated based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00.

- **IDE Channel 0/1 Master / IDE Channel 0/1 Slave**

The categories identify the types of one channel that have been installed in the computer. There are 45 predefined types and 2 users definable types are for Enhanced IDE BIOS. Type 1 to Type 45 is predefined. Type User is user-definable.

Press <PgUp>/<+> or <PgDn>/<-> to select a numbered hard disk type or type the number and press <Enter>. Note that the specifications of your drive must match with the drive table. The hard disk will not work properly if you enter improper information within this category. If your hard disk drive type does not match or is not listed, you can use Type User to define your own drive type manually.

If you select Type User, related information is asked to be entered to the following items. Enter the information directly from the keyboard and press <Enter>. This information should be provided in the documentation from your hard disk vendor or the system manufacturer.

If the controller of HDD interface is ESDI, select "Type 1".

If the controller of HDD interface is SCSI, select "None".

If the controller of HDD interface is CD-ROM, select "None".

CYLS.	number of cylinders	LANDZONE	landing zone
HEADS	number of heads	SECTORS	number of sectors
PRECOMP	write precom	MODE	HDD access mode

If there is no hard disk drive installed, select NONE and press <Enter>.

- **Video**

Select the display adapter type for your system.

- **Halt On**

This field determines whether the system will halt if an error is detected during power up.

No errors	The system boot will halt on any error detected. (default)
All errors	Whenever the BIOS detect a non-fatal error, the system will stop and you will be prompted.
All, But Keyboard	The system boot will not stop for a keyboard error; it will stop for all other errors.

Press <Esc> to return to the Main Menu page.

4.6 Advanced BIOS Features

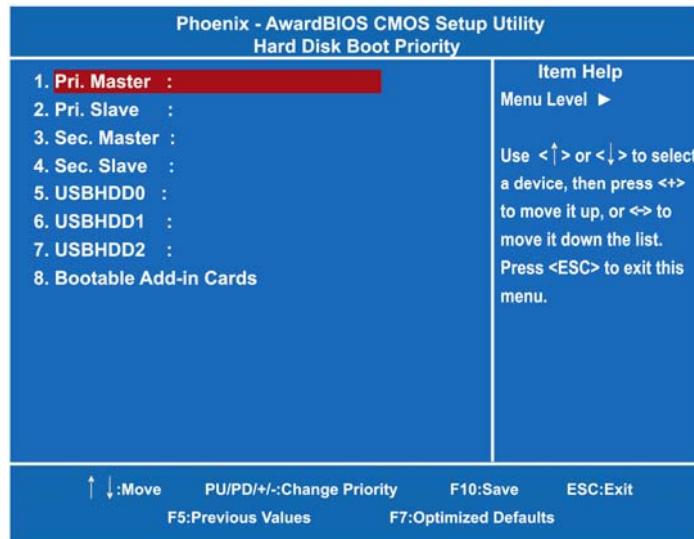
This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

Phoenix - AwardBIOS CMOS Setup Utility		
Advanced BIOS Features		
► Hard Disk Boot Priority	[Press Enter]	Item Help
Virus Warning	[Disabled]	Menu Level ►
CPU L1 & L2 Cache	[Enabled]	Select Hard Disk Boot
CPU L3 Cache	[Enabled]	Device Priority
Quick Power On Shelf Test	[Enabled]	
First Boot Device	[CDROM]	
Second Boot Device	[Hard Disk]	
Third Boot Device	[LS120]	
Boot Other Device	[Enabled]	
Boot Up NumLock Status	[On]	
Gate A20 Option	[Fast]	
Typematic Rate Setting	[Disabled]	
X Typematic Rate (Chars/Sec)	6	
X Typematic Delay (Msec)	250	
Security Option	[Setup]	
APIC Mode	[Enabled]	
MPS Version Control For OS	[1.4]	
Small Logo <EPA> Show	[Disabled]	

↑ ↓ ← → :Move Enter:Select +/-PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F7:Optimized Defaults

- **Hard Disk Boot Priority**

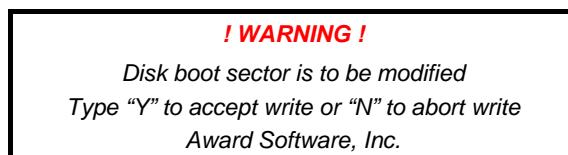
Scroll to this item and press <Enter> to view the sub menu to decide the disk boot priority.



Press <Esc> to return to the Advanced BIOS Features page.

- **Virus Warning**

This option flashes on the screen. During and after the system boot up, any attempt to write to the boot sector or partition table of the hard disk drive will halt the system with the following message. You can run an anti-virus program to locate the problem. The default setting is "Disabled".



Enabled	It automatically activates while the system boots up and a warning message appears for an attempt to access the boot sector or hard disk partition table.
Disabled	No warning message will appear for attempts to access the boot sector or hard disk partition table.



NOTE *This function is only available with DOS and other operating systems that do not trap INT13.*

- **CPU L1 & L2 Cache**

These two options speed up memory access. However, it depends on the CPU/chipset design. The default setting is “Enabled”. CPUs with no built-in internal cache will not provide the “CPU Internal Cache” item on the menu.

Enabled	Enable cache
Disabled	Disable cache

- **CPU L3 Cache**

Use this item to enable L3 cache only for the CPUs with such a function.

- **Quick Power On Self Test**

This option speeds up Power on Self Test (POST) after you turn on the system power. If set as Enabled, BIOS will shorten or skip some check items during POST. The default setting is “Enabled”.

Enabled	Enable Quick POST
Disabled	Normal POST

- **First/Second/Third Boot Device**

These items allow the selection of the 1st, 2nd, and 3rd devices that the system will search for during its boot-up sequence. The wide range of selection includes *Floppy*, *LS120*, *ZIP100*, *HDD0~3*, *SCSI*, and *CDROM*.

- **Boot Other Device**

This item allows the user to enable/disable the boot device not listed on the First/Second/Third boot devices option above. The default setting is “Enabled”.

- **Boot Up NumLock Status**

Selects power on state for NumLock. The default value is “On”.

- **Gate A20 Option**

The default value is “Fast”.

Normal	The A20 signal is controlled by keyboard controller or chipset hardware.
Fast	Default: Fast. The A20 signal is controlled by Port 92 or chipset specific method.

- **Typematic Rate Setting**

This determines the typematic rate of the keyboard. The default value is “Disabled”.

Enabled	Enable typematic rate and typematic delay programming
Disabled	Disable typematic rate and typematic delay programming. The system BIOS will use default value of these 2 items and the default is controlled by keyboard.

- **Typematic Rate (Chars/Sec)**

This option refers to the number of characters the keyboard can type per second. The default value is “6”.

6	6 characters per second
8	8 characters per second
10	10 characters per second
12	12 characters per second
15	15 characters per second
20	20 characters per second
24	24 characters per second
30	30 characters per second

- **Typematic Delay (Msec)**

This option sets the display time interval from the first to the second character when holding a key. The default value is "250".

250	250 msec
500	500 msec
750	750 msec
1000	1000 msec

- **Security Option**

This item allows you to limit access to the system and Setup, or just to Setup. The default value is "Setup".

System	The system will not boot and access to Setup will be denied if the incorrect password is entered at the prompt.
Setup	The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.



NOTE *To disable security, select PASSWORD SETTING at Main Menu and then you will be asked to enter password. Do not type anything, just press <Enter> and it will disable security. Once the security is disabled, the system will boot and you can enter Setup freely.*

- **APIC Mode**

Use this item to enable or disable APIC (Advanced Programmable Interrupt Controller) mode that provides symmetric multi-processing (SMP) for systems.

- **MPS Version Control For OS**

This item specifies the version of the Multiprocessor Specification (MPS). Version 1.4 has extended configuration tables to improve support for multiple PCI bus configurations and provide future expandability.

- **Small Logo (EPA) Show**

If enabled, the EPA logo will appear during system booting up; if disabled, the EPA logo will not appear.

Press <Esc> to return to the Main Menu page.

4.7 Advanced Chipset Features

Since the features in this section are related to the chipset on the CPU board and are completely optimized, you are not recommended to change the default settings in this setup table unless you are well oriented with the chipset features.

Phoenix - AwardBIOS CMOS Setup Utility		
Advanced Chipset Features		
DRAM Timing	[By SPD]	Item Help
CAS Latency Time	[Auto]	Menu Level ►
DRAM RAS# to CAS# Delay	[Auto]	
DRAM RAS# Precharge	[Auto]	
Precharge delay <tRAS>	[Auto]	
System BIOS Cacheable	[Enabled]	
Video BIOS Cacheable	[Disabled]	
Memory Hole At 15M-16M	[Disabled]	
** VGA Setting **		
PEG Force X1	[Disabled]	
On-Chip Frame Buffer Size	[8MB]	
DVMT Mode	[DVMT]	
DVMT/FIXED Memory Size	[128MB]	
Boot Display	[CRT+LFP]	
Panel Scaling	[Auto]	
Panel Type	[1024 x 768 48Bit]	

↑ ↓ ← → :Move Enter:Select +/-PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F7:Optimized Defaults

- **DRAM Timing Selectable**

Use this item to increase the timing of the memory. This is related to the cooling of memory.

- **CAS Latency Time**

You can select CAS latency time in HCLKs 2, 3, or Auto. The board designer should set the values in this field, depending on the DRAM installed. Do not change the values in this field unless you change specifications of the installed DRAM or the installed CPU.

- **DRAM RAS# to CAS# Delay**

When DRAM is refreshed, both rows and columns are addressed separately. This field lets you insert a timing delay between the

CAS and RAS strobe signals, used when DRAM is written to, read from, or refreshed.

- **DRAM RAS# Precharge**

The precharge time is the number of cycles it takes for the RAS to accumulate its charge before DRAM refresh. If insufficient time is allowed, refresh may be incomplete and the DRAM may fail to retain data.

- **Precharge Delay <tRAS>**

The precharge time is the number of cycles it takes for DRAM to accumulate its charge before refresh.

- **System BIOS Cacheable**

Selecting Enabled allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result. The default value is “Disabled”.

- **Video BIOS Cacheable**

This item allows you to change the Video BIOS location from ROM to RAM. Video Shadow will increase the video speed.

- **Memory Hole At 15M-16M**

Enabling this feature reserves 15MB to 16MB memory address space to ISA expansion cards that specifically require this setting. This makes the memory from 15MB and up unavailable to the system. Expansion cards can only access memory up to 16MB.

*** VGA Setting ***

- **PEG Force X1**

This BIOS feature allows you to convert a PCI Express X16 slot into a PCI Express X1 slot. When this item is enabled, the PCI Express X16 slot will be forced to run in the PCI Express X1 mode. When this item is disabled, the PCI Express X16 slot will be allowed to run its normal PCI Express X16 mode.

- **On-Chip Frame Buffer Size**

Use this item to set the VGA frame buffer size.

- **DVMT Mode**

DVMT (Dynamic Video Memory Technology) helps you select the video mode.

- **DVMT/Fixed Memory Size**

DVMT (Dynamic Video Memory Technology) allows you to select a maximum size of dynamic amount usage of the video memory. The system would configure the video memory dependent on your application.

- **Boot Display**

This item is to select Display Device that the screen will be shown.

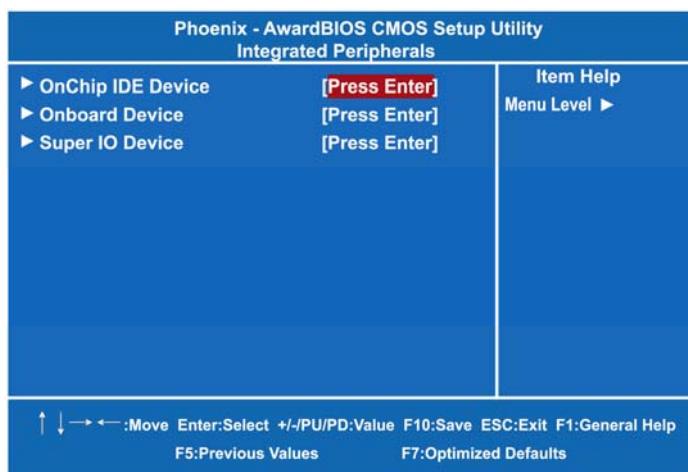
- **Panel Scaling**

This item shows the setting of panel scaling and operates the scaling function that the panel output can fit the screen resolution connected to the output port.

Press <Esc> to return to the Main Menu page.

4.8 Integrated Peripherals

This section allows you to configure your SuperIO Device, IDE Function and Onboard Device.



- **OnChip IDE Device**

Scroll to this item and press <Enter> to view the sub menu OnChip IDE Device.

Phoenix - AwardBIOS CMOS Setup Utility OnChip IDE Device		
IDE HDD Block Mode	[Enabled]	Item Help Menu Level ►
IDE DMA transfer access	[Enabled]	
On-Chip Primary PCI IDE	[Enabled]	
IDE Primary Master PIO	[Auto]	
IDE Primary Slave PIO	[Auto]	
IDE Primary Master UMDA	[Auto]	
IDE Primary Slave UMDA	[Auto]	
On-Chip Secondary PCI IDE	[Enabled]	
IDE Secondary Master PIO	[Auto]	
IDE Secondary Slave PIO	[Auto]	
IDE Secondary Master UMDA	[Auto]	
IDE Secondary Slave UMDA	[Auto]	
** On-Chip Serial ATA Setting **		
On-Chip Serial ATA	[Auto]	
PATA IDE Mode	[Secondary]	
SATA Port	P0, P2 is Primary	

↑ ↓ ← → :Move Enter:Select +/-PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F7:Optimized Defaults



IDE HDD Block Mode

Block mode is also called block transfer, multiple commands, or multiple sector read/write. If your IDE hard drive supports block mode (most new drives do), select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support.



IDE DMA transfer access

Automatic data transfer between system memory and IDE device with minimum CPU intervention. This improves data throughput and frees CPU to perform other tasks.



On-Chip Primary/Secondary PCI IDE

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select Enabled to activate each channel separately. The default value is "Enabled".



NOTE Choosing Disabled for these options will automatically remove the IDE PrimaryMaster/Slave PIO and/or IDE Secondary Master/Slave PIO items on the menu.

➤ **IDE Master/Slave PIO**

The four IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 to 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device.

➤ **IDE Master/Slave UDMA**

Select the mode of operation for the IDE drive. Ultra DMA-33/66/100/133 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver. If your hard drive and your system software both support Ultra DMA-33/66/100/133, select Auto to enable UDMA mode by BIOS.

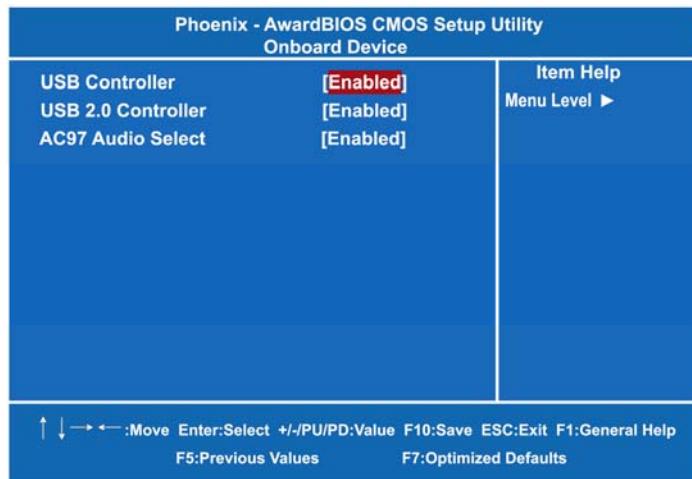
*** On-Chip Serial ATA Setting ***

- **On-Chip Serial ATA**
Use this item to enable or disable the built-in on-chip serial ATA.
- **PATA IDE Mode**
Use this item to set the PATA IDE mode. When set to Primary, P1 and P3 are Secondary; on the other hand, when set to Secondary, P0 and P2 are Primary.
- **SATA Port**
If the "PATA IDE Mode" is Primary, it will show "P1, P3 is Secondary" which means SATA 2 and SATA 4 are Secondary. If the "PATA IDE Mode" is Secondary, it will show "P0, P2 is Primary" which means SATA 1 and SATA 3 are Primary.

Press <Esc> to return to the Integrated Peripherals page.

● **Onboard Device**

Scroll to this item and press <Enter> to view the sub menu Onboard Device.



➤ **USB Controller**

Enable this item if you are using the USB in the system. You should disable this item if a higher-level controller is added.

➤ **USB 2.0 Controller**

Enable this item if you are using the EHCI (USB2.0) controller in the system.

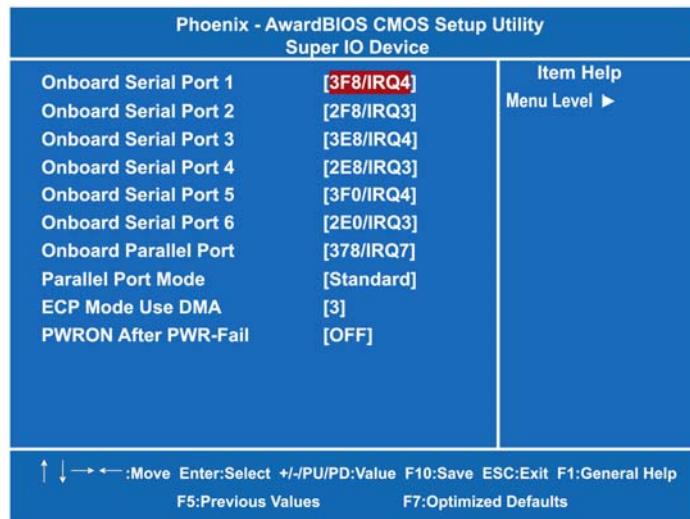
➤ **AC'97 Audio Select**

Use this item to enable or disable the onboard AC'97 Audio function.

Press <Esc> to return to the Integrated Peripherals page.

- **Super IO Device**

Scroll to this item and press <Enter> to view the sub menu Super IO Device.



- **Onboard Serial Port 1/2/3/4/5/6**
Select an address and corresponding interrupt for the serial port. Options: 3F8/IRQ4, 2E8/IRQ3, 3E8/IRQ4, 2E8/IRQ3, 3F0/IRQ4, 2E0/IRQ3, *Disabled*.
- **Onboard Parallel Port**
This item allows you to determine access onboard parallel port controller with which I/O address. The options available are 378H/IRQ7, 278H/IRQ5, 3BC/IRQ7, *Disabled*.
- **Parallel Port Mode**
Select an operating mode for the onboard parallel (printer) port. Select Normal unless your hardware and software require one of the other modes offered in this field. The options available are *EPP1.9*, *ECP*, *SPP*, *ECPEPP1.7*, *EPP1.7*.
- **EPP Mode Select**
Select EPP port type 1.7 or 1.9.
- **ECP Mode Use DMA**
Select a DMA channel for the parallel port for use during ECP mode.

➤ **PWRON After PWR-Fail**

This item enables your computer to automatically restart or return to its operating status.

Press <Esc> to return to the Integrated Peripherals page, and press it again to the Main Menu page.

4.9 Power Management Setup

The Power Management Setup allows you to save energy of your system effectively. It will shut down the hard disk and turn OFF video display after a period of inactivity.

Phoenix - AwardBIOS CMOS Setup Utility		
Power Management Setup		
ACPI Function	[Enabled]	Item Help Menu Level ►
ACPI Suspend Type	[S1(POS)]	
Power Management	[Min Saving]	
Video Off Method	[DPMS]	
Video Off In Suspend	[Yes]	
Suspend Type	[Stop Grant]	
MODEM Use IRQ	[3]	
Suspend Mode	1 Hour	
HDD Power Down	15 Min	
Soft-Off by PWR-BTTN	[Instant-Off]	
Wake-Up by PCI PME	[Enabled]	
Power On by Ring	[Enabled]	
Resume by Alarm	[Disabled]	
X Date <of Month> Alarm	0	
X Time <hh:mm:ss> Alarm	0 : 0 : 0	

↑ ↓ ← → :Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F7:Optimized Defaults

- **ACPI Function**

This item allows you to enable/disable the Advanced Configuration and Power Management (ACPI). The function is always Enabled.

- **ACPI Suspend Type**

This item specifies the power saving modes for ACPI function. If your operating system supports ACPI, such as Windows 98SE, Windows ME and Windows 2000, you can choose to enter the

Standby mode in S1 (POS) or S3 (STR) fashion through the setting of this field. Options are:

[S1(POS)] The S1 sleep mode is a low power state. In this state, no system context is lost (CPU or chipset) and hardware maintains all system context.

[S3(STR)] The S3 sleep mode is a lower power state where the information of system configuration and open applications/files is saved to main memory that remains powered while most other hardware components turn off to save energy. The information stored in memory will be used to restore the system when a "wake up" event occurs.

- **Power Management**

This option allows you to select the type of power Management. The options available are APM, ACPI.

- **Video Off Method**

This setting determines the manner in which the monitor is blanked.

V/H SYNC+Blank	Turns OFF vertical and horizontal synchronization ports and writes blanks to the video buffer
DPMS	Select this option if your monitor supports the Display Power Management Signaling (DPMS) standard of the Video Electronics Standards Association (VESA). Use the software supplied for your video subsystem to select video power management values.
Blank Screen	System only writes blanks to the video buffer.

- **Video Off In Suspend**

This item defines if the video is powered down when the system is put into suspend mode.

- **Suspend Type**

If this item is set to the default Stop Grant, the CPU will go into Idle Mode during power saving mode.

- **Modem Use IRQ**

If you want an incoming call on a modem to automatically resume the system from a powersaving mode, use this item to specify the interrupt request line (IRQ) used by the modem. You might have to connect the fax/modem to the board Wake On Modem connector for working this feature.

- **Suspend Mode**

After the selected period of system inactivity (1 minute to 1 hour), all devices except the CPU shut off. The default value is “*Disabled*”.

Disabled	System will never enter SUSPEND mode
1/2/4/6/8/10/2 0/30/40 Min/1 Hr	Defines the continuous idle time before the system entering SUSPEND mode. If any item defined in (J) is enabled & active, SUSPEND timer will be reloaded

- **HDD Power Down**

If HDD activity is not detected for the length of time specified in this field, the hard disk drive will be powered down while all other devices remain active.

- **Soft-Off by PWR-BTTN**

This option only works with systems using an ATX power supply. It also allows the user to define which type of soft power OFF sequence the system will follow. The default value is “*Instant-Off*”.

Instant-Off	This option follows the conventional manner systems perform when power is turned OFF. Instant-Off is a soft power OFF sequence requiring only the switching of the power supply button to OFF
Delay 4 Sec.	Upon turning OFF system from the power switch, this option will delay the complete system power OFF sequence by approximately 4 seconds. Within this delay period, system will temporarily enter into Suspend Mode enabling you to restart the system at once.

- **Wake-Up by PCI PME**

If enable this item, when the PCI LAN card receives an incoming call, it will send PME signals out. And then, the system can automatically resume rebooting.

- **Power On by Ring**

This option allows the system to resume or wake up upon detecting any ring signals coming from an installed modem. The default value is “*Enabled*”.

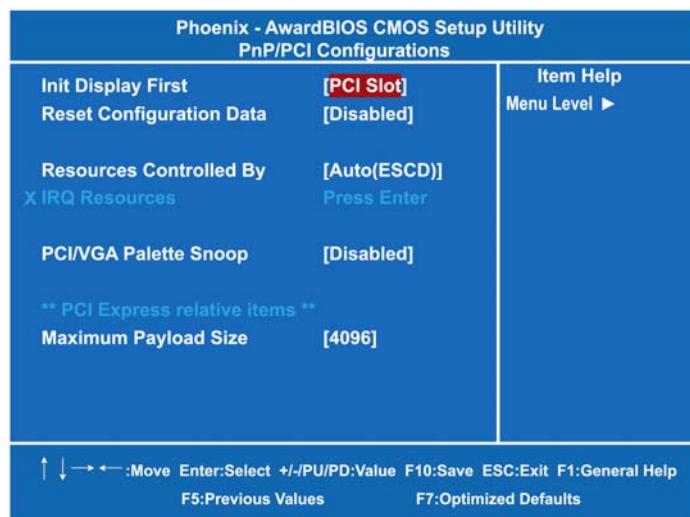
- **Resume by Alarm**

If enable this item, the system can automatically resume after a fixed time in accordance with the system's RTC (realtime clock).

Press <Esc> to return to the Main Menu page.

4.10 PnP/PCI Configuration Setup

This section describes configuring the PCI bus system. PCI, or Personal Computer Interconnect, is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its own special components. This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings.



- **Init Display First**

This item allows you to decide whether PCI Slot to be the first primary display card.

- **Reset Configuration Data**

Normally, you leave this item Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup or if installing a new add-on cause the system reconfiguration a serious conflict that the operating system can not boot. Options are: “Enabled, Disabled”.

- **Resources Controlled By**

The Award Plug and Play BIOS can automatically configure all boot and Plug and Play-compatible devices. If you select Auto, all interrupt request (IRQ), DMA assignment, and Used DMA fields disappear, as the BIOS automatically assigns them. The default

value is "Manual".

- **IRQ Resources**

When resources are controlled manually, assign each system interrupt to one of the following types in accordance with the type of devices using the interrupt:

1. Legacy ISA Devices compliant with the original PC AT bus specification, requiring a specific interrupt (such as IRQ4 for serial port 1).
2. PCI/ISA PnP Devices compliant with the Plug and Play standard, whether designed for PCI or ISA bus architecture.

The default value is "PCI/ISA PnP".

- **PCI/VGA Palette Snoop**

Some non-standard VGA display cards may not show colors properly. This item allows you to set whether MPEG ISA/VESA VGA Cards can work with PCI/VGA or not. When enabled, a PCI/VGA can work with a MPEG ISA/VESA VGA card; when disabled, a PCI/VGA cannot work with a MPEG ISA/VESA Card.

**** PCI Express relative items ****

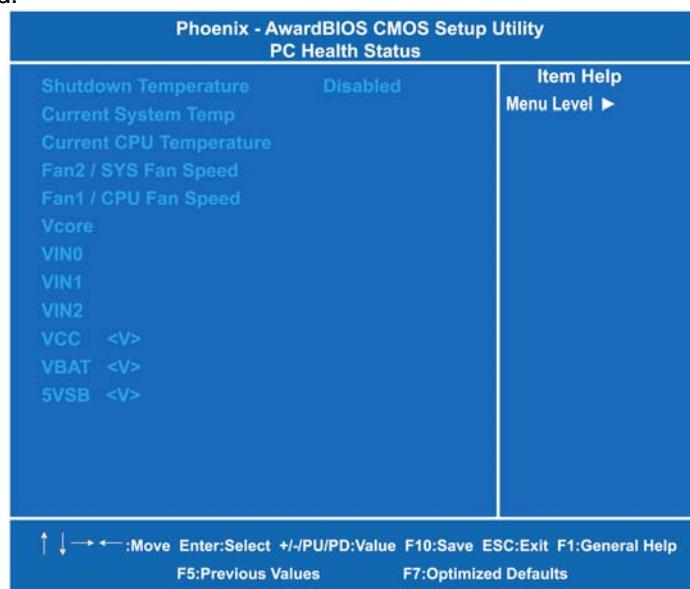
- **Maximum Payload Size**

When using DDR SDRAM and Buffer size selection, another consideration in designing a payload memory is the size of the buffer for data storage. Maximum Payload Size defines the maximum TLP (Transaction Layer Packet) data payload size for the device.

Press <Esc> to return to the Main Menu page.

4.11 PC Health Status

This section supports hardware monitoring that lets you monitor those parameters for critical voltages, temperatures and fan speed of the board.



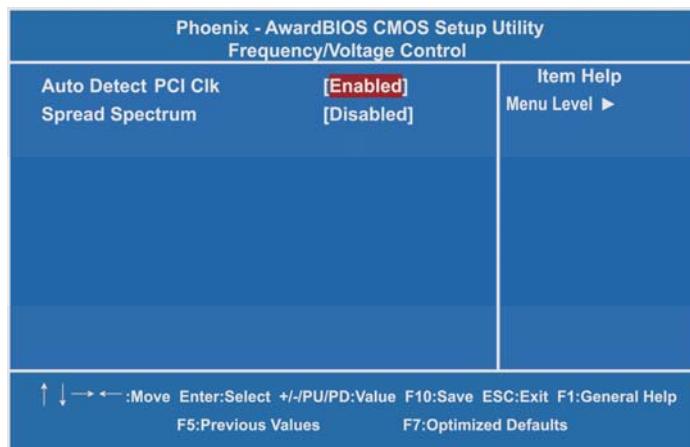
- **Shutdown Temperature**
It helps you set the maximum temperature the system can reach before powering down.
- **Current SYSTEM Temperature**
Shows you the current system temperature.
- **Current CPU Temperature**
These read-only fields reflect the functions of the hardware thermal sensor that monitors the chip blocks and system temperatures to ensure the system is stable.
- **Fan2 / SYS FAN Speed**
Shows you the current system fan temperature.
- **Fan1 / CPU FAN Speed**
These optional and read-only items show current speeds in RPM (Revolution Per Minute) for the CPU fan and chassis fan as

monitored by the hardware monitoring IC.

Press <Esc> to return to the Main Menu page.

4.12 Frequency/Voltage Control

This section is to control the CPU frequency and Supply Voltage, DIMM OverVoltage and AGP voltage.



- **Auto Detect PCI Clk**

The enabled item can automatically disable the clock source for a PCI slot which does not have a module in it, reducing EMI (ElectroMagnetic Interference).

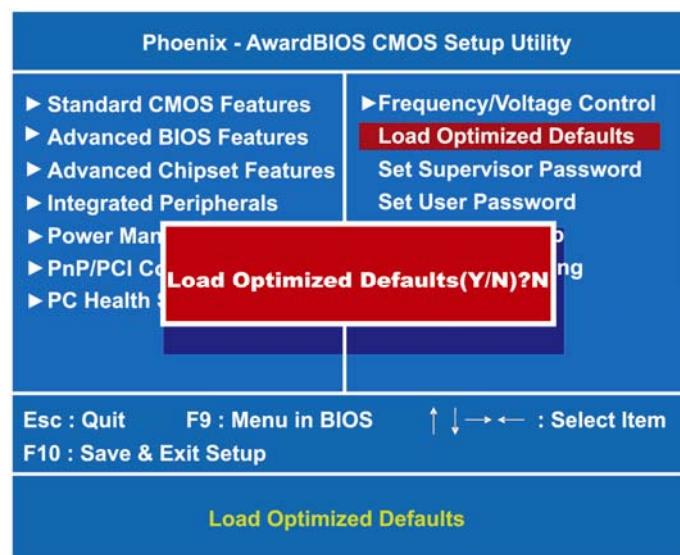
- **Spread Spectrum**

If spread spectrum is enabled, EMI (ElectroMagnetic Interference) generated by the system can be significantly reduced.

Press <Esc> to return to the Main Menu page.

4.13 Load Optimized Defaults

This option allows you to load the default values to your system configuration. These default settings are optimal and enable all high performance features.



To load SETUP defaults value to CMOS SRAM, enter "Y". If not, enter "N".

4.14 Set Supervisor/User Password

You can set a supervisor or user password, or both of them. The differences between them are:

1. **Supervisor password:** You can enter and change the options on the setup menu.
2. **User password:** You can just enter, but have no right to change the options on the setup menu.

When you select this function, the following message will appear at the center of the screen to assist you in creating a password.

ENTER PASSWORD

Type a maximum eight-character password, and press <Enter>. This typed password will clear previously entered password from the CMOS memory. You will be asked to confirm this password. Type this password again and press <Enter>. You may also press <Esc> to abort this selection and not enter a password.

To disable the password, just press <Enter> when you are prompted to enter a password. A message will confirm the password is getting disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

PASSWORD DISABLED

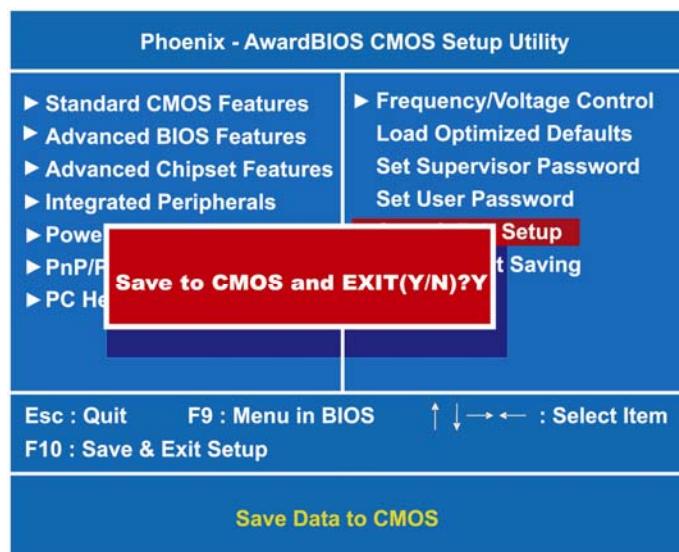
When a password is enabled, you have to type it every time you enter the Setup. It prevents any unauthorized persons from changing your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time the system reboots. This would prevent unauthorized use of your computer.

You decide when the password is required for the BIOS Features Setup Menu and its Security option. If the Security option is set to "System", the password is required during booting up and entry into the Setup; if it is set as "Setup", a prompt will only appear before entering the Setup.

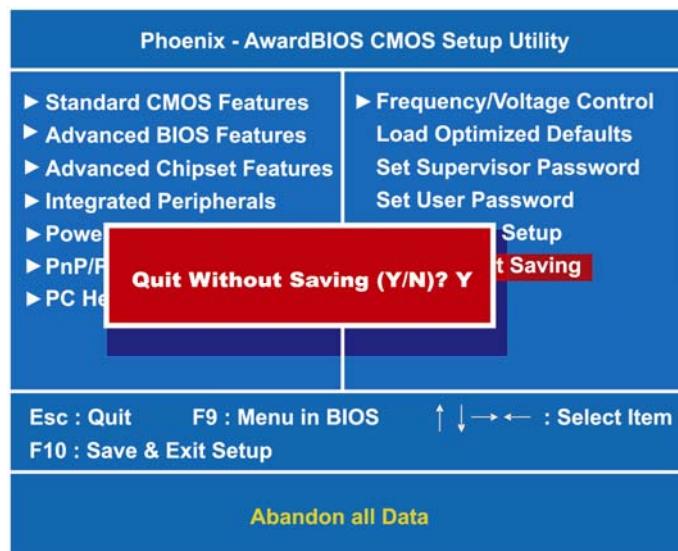
4.15 Save & Exit Setup

This allows you to determine whether or not to accept the modifications. Typing "Y" quits the setup utility and saves all changes into the CMOS memory. Typing "N" brings you back to Setup utility.



4.16 Exit Without Saving

Select this option to exit the Setup utility without saving the changes you have made in this session. Typing "Y" will quit the Setup utility without saving the modifications. Typing "N" will return you to Setup utility.



A p p e n d i x A

Watchdog Timer

Watchdog Timer Setting

After the system stops working for a while, it can be auto-reset by the Watchdog Timer. The integrated Watchdog Timer can be set up in the system reset mode by program.

Using the Watchdog Function

Start
↓
Un-Lock WDT:
 O 2E 87 ; Un-lock super I/O
 O 2E 87 ; Un-lock super I/O
↓
Select Logic device:
 O 2E 07
 O 2F 08
↓
Activate WDT:
 O 2E 30
 O 2F 01
↓
Set Second or Minute :
 O 2E F5
 O 2F N N=00 or 08
↓
Set base timer :
 O 2E F6
 O 2F M=00,01,02,...FF(Hex) ,Value=0 to 255
↓
; IF to disable WDT:
 O 2E 30
 O 2F 00 ; Can be disable at any time

- Timeout Value Range
 - 1 to 255
 - Minute / Second
- Program Sample

2E, 87	
2E, 87	
2E, 07	
2F, 08	Logical Device 8
2E, 30	Activate
2F, 01	
2E, F5	
2F, N	Set Minute or Second N=08 (Min),00(Sec)
2E, F6	
2F, M	Set Value M = 00 ~ FF

Appendix B

Digital I/O

Digital I/O Software Programming

- GPI program sample:

I 402A	Read DI0~DI4 Status
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- GPO program sample:

O 2E 87	
O 2E 87	
O 2E 07	
O 2F 08	Select Device 8
O 2E 30	
O 2F 04	Set GPIO6
O 2E E4	
O 2F 00	GPIO6 pins are programmed as output pins.
O 2E E5	
O 2F 00	Clear Data Register
O 2E E6	
O 2F N	Set DO0~DO4 Status N = 00 ~ 0F

MEMO